JOURNAL of DENTISTRY for CHILDREN

PUBLISHED BY THE AMERICAN SOCIETY
OF DENTISTRY FOR CHILDREN

Vol. X THIRD QUARTER 1943

CONTENTS

Report Writing in Dentistry
Kenneth A. Easlick 66

Treating Proximal Cavities with Silver Nitrate
George A. Peters 79

Incidence of Supernumerary and Congenitally Missing Teeth
Eugene D. Byrd 84

The Effects of Vitamins A, C and D on Teeth
Homer E. Faust 87

A.S.D.C. News and Views 95
Secretary's Message, the Massachusetts Unit,
Resolution anent the Children's Fund of Michigan.

Report Writing in Dentistry*

Kenneth A. Easlick, D.D.S.
Ann Arbor, Michigan

Contents

Suggested Outline for a Professional Paper or a Review of Literature . . 67
Form for Reporting Bibliographies
(a) Basic Abbreviations 69
(b) States, Territories, Possessions, Foreign Countries 70
(c) Periodical Abbreviations 70
Footnotes and Latin Terms 74
Miscellaneous Details 75
A Bibliography on Dental Writing and Literary Style 77

Introduction

For the past several years papers for professional journals and student's term papers in the various undergraduate and graduate dental classes have been prepared in a somewhat haphazard form with little appreciation for good organization, literary style, and bibliographical report. It would seem that inattention to the details of scientific writing is detrimental to the student and to the dental profession.

Since the style developed by a student while in school probably will continue with him in his professional practice, and since the public looks upon the dentist as an educated university graduate and the local representative of his profession, it seems important that the dental student and the dentist should acquire the fundamentals of scientific writing. The adoption of a pleasing style and an acceptable form for articles or reports, combined with correct English usage, a critical evaluation of available literature, and an accurately reported bibliography should do much to improve the quality of future dental literature.

Dental editors encourage the careful writing of articles for their various journals. Dr. L. P. Anthony, editor of the Journal of the American Dental Association, states, "I should like to impress upon all editors the importance of an accurate and full bibliography with every scientific article. . . . A full bibliography is very helpful to one in reference reading on a subject." Dr. Harold Hillenbrand, editor of Desmos and assistant editor of the Mid-Monthly issue of the Journal of the American Dental Association, stresses the importance of the use of a good dictionary, a textbook on grammar and rhetoric and literary style books in the preparation and checking of material for publication. "Give the printer (or reader) neatly arranged, exactly

*A writing and teaching outline, June, 1943.

marked and cleanly prepared copy" is the suggestion of Dr. J. H. Kauffmann, former editor of the New York Midtown Dental Society Bulletin. Dr. William R. Davis, editor of the Journal of the Michigan State Dental Society, urges editors of other dental journals, "Do not publish articles that are very poorly written . . ." These excerpts have been taken from the April 1943 Communication of the American Association of Dental Editors. Each student and dentist, as a potential author of a scientific article should note these suggestions.

With these quotations in mind it is felt that the outlines, forms, and miscellaneous details that follow should be useful in the preparation of professional and term papers, theses, and laboratory reports for the various courses in dentistry. During the preparation of bibliographies the forms suggested, including details of punctuation and abbreviation, should be followed carefully. The dental librarian is in a position to give frequent and valuable aid in the selection and preparation of bibliographies.

I. Suggested Outline for a Professional Paper or a Review of Literature*

1. Title: The title should clearly and briefly indicate the subject.
2. Introduction: Statement of problem.
   Explain the extent of the review. Describe whether it is inclusive or limited to some part of the operation, technic, treatment, or material.
3. Review of pertinent literature.
   Articles which do not include research data, clinical observations, statistical tables, tests, or description of apparatus or procedure are generally not worthy of review. In general, the recent articles on a subject are more valuable, except from the standpoint of history and development.
4. Discussion of data (facts and views) in connection with the literature.
5. Summary: A condensed account of important findings. The writer's viewpoint on the topic reviewed is desirable.
6. Conclusions: Brief statement of findings based on the data in the articles and the writer's interpretation of these data.
7. Bibliography: A numerical list of the references used in the paper. The numbers above and following the references in the paper must correspond to the numbers in the bibliography.

II. Form for Reporting Bibliographies in Dentistry

A. *Form for Books*

1. McBride, W. C. Juvenile dentistry. 2nd ed., Philadelphia, Lea and Febiger, 1937. 391 p. (p. 22-8)
2. Kallet, A. B., and Schlink, F. J. 100,000 guinea pigs. New York, Vanguard Press, 1933. XI+312 p.
3. Jay, Philip. Bacteriologic and immunologic changes in dental caries.

---

*American Dental Association standards for dental papers. Am. Dent. A. J., 27: 1159-60, July 1940. (With modifications.)

p. 348-72. (In Gordon, S. M., ed. Dental science and dental art. Philadelphia, Lea and Febiger, 1938. 731 p.)

4. Ward, M. L., ed. American textbook of operative dentistry. 7th ed., Philadelphia, Lea and Febiger, 1940. 925 p. (p. 216-7)

Note that the *city* where the book is published is given, with the *publisher's name,* and the *year* that the book was printed. In instances where *no date* is given *on the title page,* the *copyright date* is used indicating it by "c 1935". If *no date at all* is found, indicate by an "n. d." Note also that the *total pages* are given and the *introductory* pages included in Roman numerals if the book has an introduction; for example, XVI + 408 p. To cite a particular *part of a book,* add the inclusive pages in parentheses, as (p. 222-8).

Edition — Many books have gone through more than one edition, with considerable elapsed time between editions so that the contents of the older editions are usually out of date. It is desirable, therefore, that the number of the edition be noted and recorded after the title. See No. 4 above.

Editor — When an author is cited who is the editor of a book, this situation should be noted. If the contributor is cited, the reference should show clearly that the statement appears in a book edited by another person. See No. 3.

Secure all of this information when you have a reference out of the library in order to conserve your time.

B. *Form for Journals*

1. Myer, Ernest. Development of the jaws and teeth and the abnormalities common to children. Ill. Dent. J., 2:186-95, Jan. 1933.
2. Finn, S. B. Hereditary opalescent dentin. Am. Dent. A. J. and Dent. Cosmos, 25:1240-9, Aug. 1938.
3. Bunting, R. W., Jay, Philip, and Hard, D. G. A report of the successful control of dental caries in three public institutions. Am. Dent. A. J., 18: 672-8, Apr. 1931.

Note (a) Give the full name of the author, writing the surname first followed by a comma, then the given name. If the author has two or more given names, initials should be used unless one wishes to indicate a woman author.

(b) If several authors have written an article jointly, use the name of the first outhor followed by et al. For example, in reference No. 3 it is permissible to use the following: Bunting, R. W., et al. A report of the successful control . . . etc.

(c) If the author is not a person but a society, association, university, or other source, use the full name of the source in place of the name of a person. If a national, state, or city organization, write U. S., or the name of the state or city first. Follow it with a period or space, then give the name of the branch of the government. For example, American Dental Association; U. S. Public Health Service; New York (City) Department of Health; Illi-

nois State Department of Health. In instances where no author is given, the bibliographic reference is made merely by title.

(d) In a bibliography it is not necessary to repeat the full name of the author in a long list of his publications, provided there are no intervening references to other authors. If the articles by one author are all together, a long dash is sufficient to indicate that the authorship is the same. For example:

1. Taylor, N. O. A specification for dental amalgam alloys. Am. Dent. A. J., 17:112-24, Jan. 1930.
2. ——. Progress report on research on dental materials (II). The research program. Am. Dent. A. J., 17:775-9, May 1930.

(e) Note that the volume of the journal is given in Arabic numerals followed by a colon, and the inclusive pages are then noted; for example, 18: 672-8, followed by the date.

III. Abbreviations

A. List of Basic Abbreviations (American Dental Periodicals) *

Abstract	Abstr.	Education	Educ.
Academy	Acad.	Experimental	Exper.
Alumni	not abbrev.	Gazette	Gaz.
American	Am.	Government	Govt.
Annals	Ann.	Graduate	Grad.
Archives	Arch.	Health	not abbrev.
Assistant (s)	Asst.	Hygiene	Hyg.
Association	A.	Institute	Inst.
Bulletin	Bul.	International	Internat.
Bureau	Bur.	Journal	J.
Canadian	Canad.	Laboratory	Lab.
Circular	Cir.	Magazine	Mag.
Clinical	Clin.	Medicine (cal)	Med.
College	Col.	Modern	Mod.
Conference	Conf.	Monograph	Monogr.
Congress	Cong.	National	Nat.
Cosmos	not abbrev.	North	N.
County	Co.	Northern	North.
Current	not abbrev.	Odontological	Odont.
Dental	Dent.	Office	Off.
Dentistry (Dentists)	Den.	Oral	not abbrev.
Department	Dept.	Orthodontics (ia-ist)	Orthodont.
Digest	not abbrev.	Photography	Photog.
District	Dist.	Printing	Print.
East	E.	Proceedings	Proc.
Eastern	East.	Public	Pub.

*McBride, T. F. Periodical title abbreviations and bibliographic methods. Am. Dent. A. J., 26:235-8, Feb. 1939 (p. 236). With modifications.)

Quarterly	Quar.	South	So.
Radiography	Radiog.	Southern	South.
Radiology	Radiol.	State	S.
Record	Rec.	Supplement	Suppl.
Report	Rep.	Surgery	Surg.
Reprint	Repr.	Survey	Surv.
Research	Res.	Technical	Tech.
Review	Rev.	Transactions	Tr.
Science	Sc.	University	Univ.
Scientific	Scient.	West	W.
Section	Sect.	Western	West.
Society	Soc.	Yearbook	Yearb.

B. Standard List of Abbreviations for the States, Territories, Possessions* and Foreign Countries**

Australia, Austral.	Ky.	Okla.
British, Brit.	La.	Ore.
Canada, Canad.	Mass.	Pa.
Ala.	Md.	P.I.
Alaska	Me.	P.R.
Ariz.	Mich.	R.I.
Ark.	Minn.	Samoa
Calif.	Miss.	S.C.
Colo.	Mo.	S.D.
Conn.	Mont.	Tenn.
D.C.	N.C.	Tex.
Del.	N.D.	T.H.
Fla.	Neb.	Utah
Ga.	Nev.	Vt.
Idaho	N.H.	Va.
Ill.	N.J.	Wash.
Ind.	N.M.	Wis.
Iowa	N.Y.	W.Va.
Kan.	Ohio	Wyo.

C. Periodical Abbreviations†

Alpha Omegan: Alpha Omegan
American Dental Association Transactions: Am. Dent. A. Tr.
American Association of Orthodontists Transactions: Am. A. Orthodont. Tr.

---

*Chicago University Press, A manual of style. 10th ed., Chicago, Univ. Chicago Press, 1941. ix + 394 p. (p. 64).

**U. S. Surgeon General's Office. Library. Index-Catalogue, Washington, Govt. Print. Off., 1937, 4th Series, Vol. 2, 1937. (p. 21-87).

†Periodical titles used by Gregory, Winifred. Union list of serials in libraries of U. S. and Canada. N. Y., Wilson, 1927. 1588 p. (with modifications).

American Journal of Orthodontics and Oral Surgery (formerly called International Journal of Orthodontia; International Journal of Orthodontia and Oral Surgery; International Journal of Orthodontia, Oral Surgery, and Radiography; International Journal of Orthodontia and Dentistry for Children.): Am. J. Orthodont. and Oral Surg.
American Journal of Public Health: Am. J. Pub. Health
Angle Orthodontist: Angle Orthodont.
Annals of Dentistry: Ann. Den.
Apollonian: Apollonian
Archives of Clinical and Oral Pathology: Arch. Clin. and Oral Path.
Australian Journal of Dentistry: Austral. J. Den.
British Dental Journal: Brit. Dent. J.
Bulletin of the Alabama Dental Asosciation: Ala. Dent. A. Bul.
Bulletin of the American Association of Public Health Dentists: Am. A. Pub. Health Den. Bul.
Bulletin Alameda County District Dental Society: Alameda Co. Dist. Dent. Soc. Bul.
Bulletin of the Cincinnati Dental Society: Cincinnati Dent. Soc. Bul.
Bulletin of the Chicago Dental Society (Name changed to Fortnightly Review, Chicago Dental Society—1941): Chicago Dent. Soc. Fortn. Rev.
Bulletin of the Cleveland Dental Society: Cleveland Dent. Soc. Bul.
Bulletin of the Connecticut State Dental Association: Conn. S. Dent. A. Bul.
Bulletin of the Hudson County Dental Society: Hudson Co. Dent. Soc. Bul.
Bulletin of the Kings County Dental Society: Kings Co. Dent. Soc. Bull.
Bulletin of the Massachusetts State Dental Society: Mass. S. Dent. Soc. Bul.
Bulletin of the Ninth District Dental Society (New York): N.Y. 9th Dist. Dent. Soc. Bul.
Bulletin of the North Carolina Dental Society: N.C. Dent. Soc. Bul.
Bulletin of the Odontological Society of Western Pennsylvania: Odont. Soc. West. Pa. Bul.
Bulletin of the Oklahoma State Dental Society: Okla. S. Dent. Soc. Bul.
Bulletin of the Pacific Coast Society of Orthodontists: Pacific Coast Soc. Orthodont. Bul.
Bulletin of the Philadelphia County Dental Society: Phil. Co. Dent. Soc. Bul.
Bulletin of the Virginia State Dental Association: Va. S. Dent. A. Bul.
Bur: Bur
Columbia Dental Review: Columbia Dent. Rev.
Conference State Society Officers: State Soc. Officers Conf.
Contact Point: Contact Point
Current Researches in Anesthesia and Analgesia: Current Res. Anesth.
Dental Assistant: Dent. Asst.
Dental Bulletin Supplement Army Medical Bulletin: Dent. Bul. Suppl. Army Med. Bul.
Dental Digest: Dent. Digest

Dental Gazette: Dent. Gaz.
Dental Health: Dent. Health
Dental Hygiene Quarterly: Dent. Hyg. Quar.
Dental Items of Interest: Dent. Items Interest
Dental Journal of Australia: Dent. J. Austral.
Dental Laboratory Review: Dent. Lab. Rev.
Dental Magazine and Oral Topics: Dent. Mag. and Oral Topics
Dental News (New York University): Dent. News (N.Y.U.)
Dental News: Dent. News
Dental Outlook: Dent. Outlook
Dental Radiography and Photography: Dent. Radiog. and Photog.
Dental Rays: Dent. Rays
Dental Record: Dent. Rec.
Dental Students' Magazine: Dent. Students' Mag.
Dental Survey: Dent. Surv.
Dentistry—A Digest of Practice: Dentistry
Detroit Dental Bulletin: Detroit Dent. Bul.
Fortnightly Review of the Chicago Dental Society: Chicago Dent. Soc. Fortn. Rev.
Foundation Reporter: Foundation Reporter
Georgetown Dental Journal: Georgetown Dent. J.
Harvard Dental Alumni Bulletin—1941 (had been): Harvard Dent. Alumni Bul.
Harvard Dental Record: Harvard Dent. Rec.
Illinois Dental Journal: Ill. Dent. J.
Illinois State Dental Society Transactions: Ill. S. Dent. Soc. Tr.
Indian Dental Journal: Indian Dent. J.
Indian Dental Review: Indian Dent. Rev.
International Journal of Orthodontia (changed to American Journal of Orthodontics and Oral Surgery): Internat. J. Orthodont.
Iowa Dental Bulletin: Iowa Dent. Bul.
Journal of the American College of Dentists: Am. Col. Den. J.
Journal of the American Dental Association: Am. Dent. A. J.
Journal of the American Dental Hygienists' Association: Am. Dent. Hygienists' A. J.
Journal of the Arkansas State Dental Association: Ark. S. Dent. A. J.
Journal of the Baltimore College of Dental Surgery: Baltimore Col. Dent. Surg. J.
Journal of the California State Dental Association: Calif. S. Dent. A. J.
Journal of the Canadian Dental Association: Canad. Dent. A. J.
Journal of the Colorado State Dental Association: Colo. S. Dent. A. J.
Journal of Dentistry for Children (changed from Review of Dentistry for

Children): *J. Den. Children
Journal of Dental Education: *J. Dent. Educ.
Journal of Dental Research: *J. Dent. Res.
Journal of the District of Columbia Dental Society: Dist. Columbia Dent. Soc. J.
Journal of the Florida State Dental Society: Fla. S. Dent. Soc. J.
Journal of the Georgia State Dental Association: Ga. S. Dent. A. J.
Journal of the Houston Dental Society: Houston Dent. Soc. J.
Journal of the Indiana State Dental Association: Ind. S. Dent. A. J.
Journal of the Kansas State Dental Association: Kan. S. Dent. A. J.
Journal of the Michigan State Dental Society: Mich. S. Dent. Soc. J.
Journal of the Missouri State Dental Association: Mo. S. Dent. A. J.
Journal of the Nebraska State Dental Society: Neb. S. Dent. Soc. J.
Journal of the New Jersey State Dental Society: N. J. S. Dent. Soc. J.
Journal of the Dental Society of the State of New York: Dent. Soc. S. of N.Y. J.
Journal of the Ohio State Dental Society: Ohio S. Dent. Soc. J.
Journal of the Oregon State Dental Association: Ore. S. Dent. A. J.
Journal of Periodontology: *J. Periodont.
Journal of the Second District Dental Society (New York): N.Y. 2nd Dist. Dent. Soc. J.
Journal of the Southern California State Dental Association: South. Calif. S. Dent. A. J.
Journal of the Tennessee State Dental Association: Tenn. S. Dent. A. J.
Journal of the Washington State Association: Wash. S. Dent. A. J.
Journal of the Wisconsin State Dental Society: Wis. S. Dent. Soc. J.
Midtown Dental Society Bulletin (New York City): N.Y.C. Midtown Dent. Soc. Bul. (changed to N.Y. Co. Dent. Soc. Bul.)
Minneapolis District Dental Journal: Minneapolis Dist. Dent. J.
Modern Dentistry: Mod. Den.
Mouth Mirror: Mouth Mirror
National Dental Hospital Gazette: Nat. Dent. Hosp. Gaz.
New York Journal of Dentistry: N.Y. J. Den.
New Zealand Dental Journal: N.Z. Dent. J.
North-west Dentistry: North-west Den.
Northwestern University Dental School Dental Research and Graduate Study Bulletin: Northwest. Univ. Dent. School Res. Bul.
Oral Health: Oral Health
Oral Hygiene: Oral Hyg.

---

*"If the periodical is the Journal (Bulletin, Proceedings, etc.) of a society, or institution, the entry is under the corporate names of the organization. When the title does not include a corporate name the entry is under the first word of the title." Soule, B. A. Library guide for the chemist. New York, McGraw-Hill Co., 1938. XIII + 302 p.

Pacific Dental Gazette: Pacific Dent. Gaz.
Penn Dental Journal: Penn Dent. J.
Pennsylvania State Dental Journal: Pa. S. Dent. J.
Proceedings of the American Association of Dental Schools: Am. A. Dent. Schools Proc.
Proceedings of the Tenth Australian Dental Congress: Austral. Dent. Cong. (10th) Proc.
Proceedings of the National Association of Dental Examiners: Nat. A. Dent. Examiners Proc.
Proceedings of the Dental Centenary: Dent. Centenary Celebration Proc.
Proceedings of the Royal Society of Medicine Section of Odontology: Roy. Soc. Med. Sect. Odont. Proc.
Public Health Reports: Pub. Health Rep.
Review of Dentistry for Children (name changed to Journal of Dentistry for Children): Rev. Den. Children
Royal Dental Hospital Magazine: Roy. Dent. Hosp. Mag.
St. Louis Dental Society Bulletin: St. Louis Dent. Soc. Bul.
South African Dental Journal: S. African Dent. J.
Temple Dental Review and Garretsonian: Temple Dent. Rev. and Garretsonian
Texas Dental Journal: Tex. Dent. J.
Tufts Dental Club Bulletin: Tufts Dent. Club Bul.
Tufts Dental Outlook: Tufts Dent. Outlook
Transactions of the American Association of Dental Editors: Am. A. Dent. Editors Tr.
United States Naval Medical Bulletin: U. S. Nav. Med. Bul.
Washington University Dental Journal: Wash. Univ. Dent. J.
West Virginia Dental Journal: W.Va. Dent. J.

IV. The Use of Footnotes and Latin Terms

Although several good references to literary style are listed in the bibliography, it seems desirable to include at this point a few notes on the use of footnotes, Latin terms and miscellaneous details of grammar. This material is included for the convenience of the student, to conserve his time, and to make some details readily available. No attempt is made to exhaust the subject, but these notes may call to the attention of the student some of the precautions to be observed. The references to grammatical form and literary style may be used for a more complete treatment of these phases of writing.

A. *Footnotes.** Footnotes are present in nearly every scholarly piece of work; yet their overgenerous use is irritating, and never is their use a substi-

*1. Cole, A. H. A manual of thesis-writing. New York, Wiley, c. 1935. ix + 51 p. (p. 25).
2. Iowa State College. Graduate College. Regulations and suggestions for the preparation of theses. Ames, Iowa, 1941. (Mimeo.) III + 67 p. (p. 21).
3. Michigan University. College of Engineering. Department of English. A stylebook for manuscripts. Ann Arbor, Univ. of Mich., 1938. 34 p. (Proc.) (p. 5).

tute for real scholarship. Footnotes usually have the following functions: (1) to introduce additional evidence; (2) to define terms or concepts found in the text; (3) to amplify the discussion beyond the point permissible in the text; (4) to acknowledge indebtedness; and (5) to provide cross references to various parts of the thesis or text.

(a) *Place.* Although footnotes may be put at the end of a chapter, it is preferable that they be placed at the bottom of a page.

(b) *Sequence.* Footnotes may be numbered consecutively (1) throughout the text, (2) throughout each section or chapter, or (3) on each page. The third method has the advantage that it permits additional footnotes to be inserted and does not disarrange the numbering of those that follow.

(c) *Spacing.* A line is drawn a third of the way across the page to separate the footnotes from the text. This line is one space below the last line of the text. Begin the first line of the footnote at paragraph indentation two spaces below the line. Single-space the lines of the footnotes.

B. *Latin Terms.* The United States Department of Interior in its *Suggestion to Authors*** has the following to say about the use of Latin terms, p. 30:

"The use of Latin terms in footnotes to avoid frequent repetition of titles is confined to 'op. cit.' and 'idem.' 'Op. cit.' may be used if the previous reference is not far away, provided there can be no doubt as to what work is cited. . . . However, for the reader's sake, 'op. cit.' should be used sparingly. 'Idem' is used only for the second citation of the same work, immediately following the first, on the same page. 'Idem' may represent all the preceding citation except the page numbers, or it may be used to represent simply the journal just cited, the author and title being different. The forms 'ib', 'ibid.', 'ibidem', and 'loc. cit.' are not used—not because they are not good Latin but for the sake of simplicity."

V. Miscellaneous Details

In the preparation of professional papers and reports the writer is cautioned about "careless writing." The rules of good grammar and correct English should always be observed in report writing. Many papers which are otherwise satisfactory show poor style, incorrect choice of words, and failure to observe ordinary rules of writing. Frequent reference to a good dictionary for correct spelling and meaning of words will be of assistance. It is desirable to consult a good English grammar and style book frequently regarding acceptable forms of writing. Several books of this type are listed in the bibliography at the end of this outline.

A review of the following items should help to prevent some common mistakes of "careless writing." Most of these items have been taken from "A

**Lane, B. H., ed. Suggestions to authors. 4th ed., Washington U. S. Govt. Print. Off., 1935. VII + 126 p.

stylebook of manuscripts." Michigan Univeristy. College of Engineering. Department of English. 1938. 34 p.

Conjunctions. Avoid the constant repetition of "and," "or," "but," and "while." Learn to employ other conjunctions, which are frequently more effective than those mentioned. Distinguish between the use of "while" and "whereas." The former connotes time rather than contrast.

Correlatives. Be sure to place in correlative positions "either . . . or," "both . . . and," "not only . . . but also," and the like.

Double Negatives. The double negative is a form of grammatical redundancy which is always to be avoided. "There isn't but one conclusion . . ." is an example of *but* used in the sense of *only* in which case it should not be used with another negative. A better form is "There is only one conclusion . . .".

Legibility. Every word, letter, mark of punctuation, and symbol should be legible. Those which cannot readily be deciphered will be questioned by the critic.

Mannerisms. Writers should beware of mannerisms. Editors report that they find the same word or same expression repeated *ad nauseam* even in a short paper. Learn to use synonyms.

Neatness. Write on one side of the sheet only. Do not fold or roll sheets, or turn down the corners. Make a fresh copy for every page that appears untidy, for soiled manuscripts, whether presented to intimates or strangers, are never acceptable.

Number. The number (singular, plural, collective) of the noun should be carefully determined and used with a corresponding form of the predicate in the sentence.

Participles. Do not use a participle without regard for its relationship to other elements of the sentence, because a participle must depend on a substantive. A relative pronoun may have a clause as an antecedent, but this rule does not hold true for the participle. Hence the writer should avoid sentences which are concluded with constructions similar to the following: ". . . thus making the purchase unnecessary"; ". . . thereby resulting in a complete victory for the scientist."

Plurals. Note that "data" and "strata" are plurals of "datum" and "stratum" respectively. Hence they require the plural form of the verb rather than the singular, for example: "the data are," "the strata are," "the data which are," and "the strata which are." Their modifiers must also be in the plural form: "many data," "those data," "these strata."

Prepositions. Do not arbitrarily make prepositions out of participles. It is true that "considering" has become a preposition, but "following" and "assuming" must still be construed as participles.

Proofreading. Before a manuscript is submitted, it should be read care-

fully, so that all errors may be detected and corrections made. Proofreading is best done by reading aloud. One should also ask some competent person to criticize a paper. After all errors are noted, corrections should be made in ink.

Punctuation. The primary function of punctuation is to clarify sentence structure. For guidance in the various uses of punctuation marks refer to an English grammar.

Quotations.

A. Put in quotation marks (double marks) all material taken verbatim from the works of other writers or from the utterances of other speakers.

1. If several consecutive paragraphs are quoted, place quotation marks at the beginning of each paragraph and at the end of the last.
2. Use single marks to indicate a quotation within a quotation.

B. Follow American conventions in placing quotation marks.

1. Place closing quotation marks outside of the period or comma (no exceptions).
2. Place closing quotation marks outside a question mark or an exclamation mark if either of these marks is a part of a quotation (inside, if not a part).
3. Place closing quotation marks inside a colon, a semicolon, or a dash.

References to the Writer. Avoid reference to oneself as "the writer," "the author," the present writer," and the like. The personal pronoun "I" is usually less obtrusive than such expressions. One may utilize always the third person singular.

Sentences. In expository writing always use complete sentences. Avoid even grammatically correct elliptical sentences.

Slang, Colloquialisms, Dialectal Forms, New Words, Coined Words, Simplified Spelling. Use with discrimination all words at variance with conventional forms. When words or expressions of such character must be used in expository writing, be sure that they are understandable; also, place them in quotation marks.

Split Infinitive. Avoid the split infinitive—an adverb placed between *to* and the infinitive with which it is joined. An awkward construction follows: "I want *to* finally *bring* this point up for discussion."

"This" as a Subject. Avoid the vague use of "this" as a subject to refer to doubtful antecedents. For example, it is not always clear to say "This shows the trend of the experiment." It is preferable to say "These data show . . ."

VI. A. Bibliography on Dental Writing

1. McBride, T. F. Periodical title abbreviations and bibliographic methods. Am. Dent. A. J., 26:235-8, Feb. 1939.

2. Anthony, L. P., Compiler, Survey Committee of Am. Assoc. of Dental Editors. American Association of Dental Editors: Qualifications and duties of a dental editor. Am. Dent. A. J., 27:1523-4, Sept. 1940.
3. Alcorn, F. J., et al. So you're going to write an article! Ill. Dent. J., 9:365-72, Ovt. 1940.
4. American Dental Association standards for dental papers. Am. Dent. A. J., 27:1159-60, July 1940.
5. Brandhorst, O. W. Dental literature. Am. Dent. A. J., 27:267-9, Feb. 1940.
6. Weinberger, B. W. Code of abbreviations for dental journals. Dent. Surv., 12:314-9, Aug. 1936.
7. Johnson, C. N. The problems of the editor. Am. Dent. A. J. and Dent. Cosmos, 24:1516-20, Sept. 1937.
8. McBride, T. F. Title abbreviations for American dental periodicals and bibliographic methods. J. Dent. Res., 16:537-44, Dec. 1937.
9. Ward, M. L. An editorial experience with the prefixes peri- and para-, and the suffixes -osis and -clasia. J. Dent. Educ., 5:259-9, Apr. 1941.
10. Anthony, L.P., et al. Report of the committee on nomenclature of the American Dental Association. Am. Dent. A. J., 22:2233-6, Dec. 1933.

B. References on Literary Style

1. Chicago University Press. A manual of style. 10th ed. Chicago, Univ. Chicago Press, 1941. IX + 394 p.
2. Hutchinson, Lois. Standard handbook for secretaries. New York, McGraw Hill, 1936. X + 616 p.
3. Mawson, C. O. S., and Robson, J. W. The complete desk book. New York, Thomas Y. Crowell, 1939. VII + 374 p.
4. Cole, A. H., and Bigelow, K. W. A manual of thesis-writing. New York, John Wiley, c 1935. IX + 51 p.
5. Baker, Josephine T. Correct English complete grammar and drill book. Chicago, Correct English Publications, 1938. 345 p.
6. Fowler, H. W. A dictionary of modern English usage London, Oxford at the Clarendon Press, 1934. VIII + 742 p.
7. Good, W. R. An introduction to thesis writing. Ann Arbor, The Ann Arbor Press, c 1937. 48 p.
8. Michigan University. College of Engineering. Department of English. A stylebook for manuscripts. Ann Arbor, Univ. of Mich., 1938. 34 p.

—*University of Michigan School of Dentistry.*

Treating Proximal Cavities with Silver Nitrate

By George A. Peters, D.D.S.
Springfield, Illinois

The use of silver nitrate in dentistry was reported as far back as one hundred years ago. Because bacteria have been associated with dental caries there has been a desire for a chemical application to eliminate or control bacterial growth. In the selection of an antiseptic for cavity sterilization, however, pulp reaction must be considered.

The desirability of the elimination of bacterial contamination in the dentin under fillings is, of course, admitted by investigators. Seltzer[1] points out in a discussion of his work that bacteria have been found in the dentin even after thorough cavity preparation. Many chemicals are strong enough to kill all of the bacteria present in a cavity but they may prove injurious to the pulp.

A complete understanding of the properties and reactions of any antiseptic that is employed is of prime importance. Zander[2] states that silver nitrate should be used as a matter of routine in all cavities where the subsequent appearance of the tooth is not important. The use of silver nitrate does not excuse the failure to remove softened dentin in the depth of a cavity, except when such removal would expose the pulp. However, the widespread use of silver nitrate in lieu of restorations is to be discouraged. Caries will not be arrested in most instances following such treatment and loss of space in the arch will result from unfilled cavities.

Ireland[3] suggests a pulpotomy or a pulpectomy if the soft, carious dentin extends to the pulp. In other words, the use of silver nitrate is to be discouraged in the instances where caries has penetrated the pulp. Ireland states further that the use of silver nitrate is a safe procedure and that there is a good prognosis when the radiogram indicates that the carious process has not penetrated to the pulp, and the pulp exhibits some evidence of recession. Such teeth no doubt will have a layer of secondary dentin. Selecting teeth for treatment at random with no attention to their histories may result in failures. Silver nitrate and eugenol may be used with safety in cavities if there is a layer of primary or secondary dentin between the base of the decay and the pulp.

Prime[4] advocates the treatment of proximal surfaces at an early date. According to his statement, it is too late to use silver nitrate and eugenol

when the radiogram or explorers will detect the cavity. The time to use silver nitrate is before cavitation and before the break is large enough to be seen.

Seltzer and Werther[5] advocate the use of silver nitrate in the treatment of deep caries. They leave soft dentin undisturbed if a pulp exposure seems imminent and they treat this dentin with ammoniacal silver nitrate solution reduced by eugenol.

In the studies of Klein and Knutson[6] an attempt has been made to critically evaluate the efficacy of silver nitrate as a caries-prophylactic agent. Because 75 per cent of permanent tooth decay in elementary school children is found in the first permanent molar, their work has been confined to this tooth. While Prime's proximal surface studies are slightly different and he advocates fillings for occlusal surfaces I think that his results should be comparable with those of Klein and Knutson. In the investigation of Klein and Knutson quantitative information on two questions seemed desirable, namely (1) Will repeated topical applications of ammoniacal silver nitrate prevent the initiation of caries when the chemical is applied to all surfaces of caries-free first permanent molars? (2) Will repeated topical applications of ammoniacal silver nitrate on carious surfaces of first permanent molars prevent the extension of the carious lesions?

The subjects used in the experimental procedure consisted of about seven hundred white children selected at random, the majority of whom were enrolled in the first grades of elementary schools. In the fall of 1937 each child had ammoniacal silver nitrate applied to the right maxillary first permanent molar and the left mandibular first molar. The first molars on the opposite sides of the mouth were not treated and, hence served as controls. The ammoniacal silver nitrate solution application with eugenol reduction was made on the occlusal surfaces as well as the proximal surfaces in this study. In the fall of 1938 and again in the fall of 1939, as many of the original group of children as could be found were examined and the same teeth re-treated. Four hundred seventy-four children of the original group were re-examined in 1941. To present a picture of the 1937 situation and also of the findings in the spring of 1941, the following tables are self-explanatory.

It is quite obvious that the answer to both of the questions that were studied is no. At least, this study during a 4½ year period shows that a very small and inconsistent difference exists between the treated and control teeth in regard to caries attack and the extension of carious lesions.

Now it is very interesting to compare this study with Prime's results and to find such a variance in results. In substance, it is apparent from the foregoing results that the difference in the percentages of treated and control teeth attacked by caries or showing an extension of carious lesions was small and inconsistent. In fact the treated molars suffered the greater caries.

TABLE 1.—Age and Sex Distribution of 474 School Children Included in Silver Nitrate Study.

Sex	Age at Last Birthday (1937)									
	4	5	6	7	8	9	10	11	12	All Ages
Male	1	11	83	73	40	24	4	2	1	239
Female		13	75	84	49	14				235
Both sexes	1	24	158	157	89	38	4	2	1	474

TABLE 2.—Condition of Treated (T) and Control (C) First Permanent Molars in 1937, Numbers and Percentages Based on Dental Examinations of 474 School Children.

Condition in 1937	First Permanent Molars											
	Number						Percentage					
	Maxillary		Mandibular		Both		Maxillary		Mandibular		Both	
	T	C	T	C	T	C	T	C	T	C	T	C
Unerupted	77	76	65	66	142	142	16.3	16.1	14.2	14.3	15.3	15.2
Caries-free	301	320	253	276	554	596	64.0	67.8	55.1	60.0	59.6	63.9
Carious, one surface	76	61	109	95	185	156	16.2	12.9	23.7	20.7	19.9	16.7
Carious, two surfaces*	16	15	32	23	48	38	3.4	3.2	7.0	5.0	5.2	4.2
Total	470	472	459	460	929	932	100.0	100.0	100.0	100.0	100.0	100.0

*Thirty-five molars, nineteen among the T group and sixteen among the C group, have been omitted from the analysis, since they showed carious lesions in three or more surfaces or were filled or extracted.

TABLE 3.—Condition, in 1941, of Treated (T) and Control (C) First Permanent Molars Which Showed Specified Conditions in 1937, Numbers and Percentage Based on Dental Examinations of 474 School Children.

Condition and Year		First Permanent Molars											
		Number						Percentage					
		Maxillary		Mandibular		Both		Maxillary		Mandibular		Both	
1937	1941	T	C	T	C	T	C	T	C	T	C	T	C
Unerupted	Caries-free	21	36	16	19	37	55	27.3	47.4	24.6	28.8	26.1	38.7
	One or more surfaces attacked by caries	56	40	49	47	105	87	72.7	52.6	75.4	71.2	73.9	61.3
Caries-free	Caries-free	55	84	59	51	114	135	18.3	26.2	23.3	18.5	20.6	22.7
	One or more surfaces attacked by caries	246	236	194	225	440	461	81.7	73.8	76.7	81.5	79.4	77.3
Carious, one surface	One surface attacked by caries	28	23	18	10	46	33	36.8	37.7	16.5	10.5	24.9	21.2
	Two or more surfaces attacked by caries	48	38	91	85	139	123	63.2	62.3	83.5	89.5	75.1	78.8
Carious, two surfaces†	Two surfaces attacked by caries	7	4	3	4	10	8	43.7	26.7	9.4	17.4	20.8	21.1
	Three or more surfaces attacked by caries	9	11	29	19	38	30	56.3	73.3	90.6	82.6	79.2	78.9

*Thirty-five molars, nineteen among the T group and sixteen among the C group, have been omitted from the analysis, since they showed carious lesions on three or more surfaces or were filled or extracted.

†The number of teeth showing specified conditions in 1937, and on which the percentages are based, are shown in Table 2.

As the results obtained in the work with ammoniacal silver nitrate seem to vary a great deal, evidence which would justify either negative or positive conclusions with respect to the prophylactic and caries-arresting ability of ammoniacal silver nitrate on the proximal surfaces of the teeth remains to be presented. The development of a procedure which the dentist could use and invariably prevent caries and also limit the extension of existing lesions is very much to be desired. It would seem apparent that conclusive quantitative evidence from adequately controlled experiments is desirable.

In this conclusion Prime[7] seems to agree as he states that it will require the observation of many cases over a period of years to definitely determine the value of ammoniacal silver nitrate. How long it will keep etched surfaces immune and what it will do to perpetuate immunity on decayed surfaces still must be proved.

BIBLIOGRAPHY

1. Seltzer, Samuel. Effective duration of some agents used for dentin sterilization. J. D. Res., 21:115-23, Apr. 1942.
2. Zander, H. A. Use of silver nitrate in the treatment of caries. Am. Dent. A. J., 28:1260-7, Aug. 1941.
3. Ireland, R. L. The treatment of deep carious areas in the primary and young permanent teeth by means of ammoniacal silver nitrate. Mich. S. Dent. Soc. J., 24:187-8, Aug. 1942.
4. Prime, J. M. Preventive dentistry. Am. Dent. A. J., 27:1213-22, Aug. 1940.
5. Seltzer, Samuel, and Werther, Lester. Conservative silver nitrate treatment of borderline cases of deep dental caries. Am. Dent. A. J., 28:1586-94, Oct. 1941.
6. Klein, Henry, and Knutson, J. W. Studies on dental caries. Am. Dent. A. J., 29:1420-6, Aug. 1942.
7. Prime, J. M. Further extending use of Howe's ammoniacal silver nitrate in control of dental caries. Dent. Cosmos, 77:1046-59, Nov. 1935.

—Division of Dental Health Education,
State Department of Health.

May we call attention and suggest your reading the editorials on Dentistry for Children and on the Dental Pictorial in the current (August, 1943) Journal of the American Dental Association.

Incidence of Supernumerary and Congenitally Missing Teeth*

By Eugene D. Byrd, D.D.S.

Baltimore, Md.

In a survey made at the Murry and Leonie Guggenheim Dental Clinic in New York City, many interesting facts were obtained concerning congenitally missing and supernumerary teeth. No attempt was made to establish the etiological factors, but it was hoped rather to give to the profession an incidence index so that early recognition may be made of these conditions and expedient treatment instituted.

Radiographic examinations were made on 2,835 school boys and girls ranging from 4 to 14 years in age. These children represented all ethnological pure and intermingling groups and the facts determined represented a mixture of races. The ages 4 to 14 were selected because within these age limits we are generally able to determine the presence or absence of all permanent tooth buds, with the possible exception of third molars. Likewise, the presence of supernumerary teeth can be determined within these ages.

For the purpose of this study, a congenitally missing tooth is one not demonstrable radiographically at a time considered reasonable according to Kronfeld's charts. Since the youngest child examined was 4 years old, all the permanent teeth (with the exception of the 3rd molars) should have been evident radiographically in all these cases here studied.

The third molar was omitted purposely for the reason that presence or absence of this tooth could not easily be established radiographically. For, according to Logan and Kronfeld, evidence of third molar calcification first appears between 7 and 10 and a majority of the children examined ranged from 4 to 7 years of age.

Of the 2,835 children examined, 1,437 were male and 1,398 were female. No attempt was made to equalize the number of male and female patients admitted for treatment.

The following facts were determined:

Of the total number examined, 79 children presented congenitally missing teeth with a total of 145 teeth missing. Examining the missing teeth for sex distribution, it was found that 45 were in female and 34 in male. Considering the total teeth missing 77 were female as compared to 68 male. The teeth missing were bilateral in 47 of the children. Distribution is shown in Figures 1 and 2.

---

*A survey of 2,835 children, taken from the files of the Murry and Leonie Guggenheim Dental Clinic, New York.

DISTRIBUTION OF CONGENITALLY MISSING TEETH—MALES

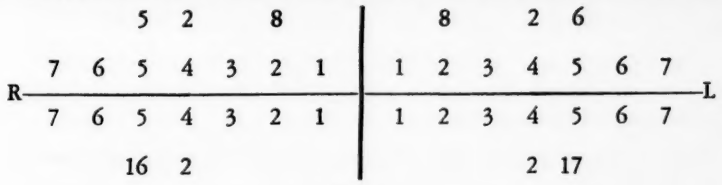

FIG. 1

DISTRIBUTION OF CONGENITALLY MISSING TEETH—FEMALES

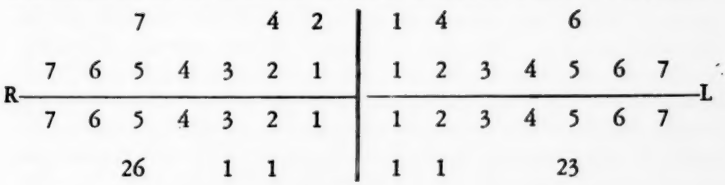

FIG. 2

The incidence of congenitally missing teeth radiographically was .027 per cent. The ratio of male to female was 1 to 1.3, or 0.3 per cent more in the female.

The same 2,835 children were examined radiographically for supernumerary teeth. Only 15 children presented supernumerary teeth. Further, only a total of 16 supernumerary teeth were found. The sex distribution was 4 female and 11 male. In terms of the total of supernumerary teeth present, 4 were found in the female and 12 in the male. Here the incidence of cases was found to be low, about .005 per cent. However, the sex ratio may be more significant, in that there were three male to each one female. As a matter of special note all of the supernumerary teeth were located in the upper incisor region.

With these facts and the figures in mind, what significance can be attributed to this study aside from its statistical value? True, the differences are slight, yet they may be sufficient to show a possible tendency, inasmuch as there were more instances of congenitally missing teeth in the female and more instances of supernumerary teeth in the male. Perhaps we may interpret this as a tendency on the part of nature to conservation in the female and extravagance in the male, for this does seem to be true in the developmental pattern of body growth as a whole.

I believe, as do other investigators, that the tendency to missing as well as to supernumerary teeth occurs in definite hereditary sequence. In one

sister-brother combination the left mandibular second bicuspid was missing in the boy and both the right and left second biscuspids in the girl.

In another instance a little girl presented gemination of the mandibular deciduous lateral and cuspid on the right and left sides, and both mandibular permanent laterals were congenitally missing.

The question has been asked what to do when these conditions present.

This is the clinic procedure for supernumerary teeth: several radiographs are taken from different angles to fix the position of the tooth and its position relative to adjacent teeth, especially to the apices of these teeth. If the tooth in question lies close to the open apex of a developing permanent tooth, removal of the supernumerary tooth is delayed until root formation of the permanent tooth has progressed to a point where unnecessary damage is unlikely. When the supernumerary tooth is to be removed the parent is consulted. At this time an adequate explanation is given the parent and consent is obtained. The tooth is then removed employing a generally accepted technique. We have removed many supernumerary teeth which if permitted to remain could have caused serious complications in later life.

This is the Clinic procedure for congenitally missing teeth: radiographs are taken early to determine the absence of the tooth, or teeth. If the teeth missing are of the permanent set then all effort is made at least till jaw development has been completed to retain the deciduous teeth which they should replace. This requires early protective dentistry, such as proper prophylaxis and filling. Incidentally, I find no evidence to support the theory that filling causes the earlier resorption of deciduous teeth which have no permanent successor. If such early resorption does occur I believe that it is the result of traumatogenic occlusion caused by unlike antogonists, and not by the presence of the filling.

The procedure for treatment as it is outlined above may not be feasible for every dental practitioner because of his limitation in experience or equipment. Under these circumstances he should take the time to diagnose the condition and should recommend a dentist who can render the required service. It is imperative that early diagnosis and regular periodic check be made on the condition of these deciduous teeth with no permanent successors for they must serve as long a time as is possible.

In summary, more supernumerary teeth are found in males than in females, and more congenitally missing teeth in females than in males. And, more congenitally missing teeth are bilateral than unilateral. The most important factor to be considered is the early diagnosis of the condition and this means the use of good radiographs. The parent should be properly informed and the condition kept under observation until such time as proper treatment can be most advantageously employed.

The Effects of Vitamins A, C and D on Teeth

By Homer E. Faust, D.D.S.
Ann Arbor, Mich.

Vitamins are subjects of extraordinary interest at present, owing to the revolutionary advances in biochemistry. Chemical formulas have been determined, purified vitamins have been prepared and substances that were once considered mysterious unknowns to be designated alphabetically are now familiarly known as definite chemicals that can be tested chemically and in some instances measured quantitatively.

Much work has been done, both experimentally and clinically, on the role of the vitamins in the formation of teeth and on their significance to the fully erupted tooth. Most of this work has been carried out with the prevention of dental caries as the primary interest. A study of the causes of tooth decay in experimental animals unfortunately has always been very difficult, complicated as it is by the inability to find small laboratory animals with a permanent tooth structure resembling that of the human being and teeth in which caries can be produced. Much experimental work has been done on rats, however, although Hoppert[1] and his co-workers have shown that rat caries can be produced at will simply by the inclusion of coarsely ground cereals in an otherwise adequate diet. The same cereals ground finely produced no caries. Most of the laboratory animals, valuable as they are for the study of many nutritional problems, may be quite unsuited to the study of human caries. Furthermore, data from animal experiments apparently do not always harmonize well with the clinical findings in the human mouth.

It is well understood that vitamins play an important part in the formation of bones and teeth; however, considerable controversy exists over the role of these same vitamins in the maintenance of these structures. Three vitamins, A, C, and D, have been shown to exert some effect on the formation of calcified structures.

Vitamin A is concerned with the epithelial structures of the body, serving ostensibly as a specific for them during their development. Its effect on the dentition is still somewhat controversial, although defects in enamel due to an A deficiency have been demonstrated conclusively. Howe, Bessey and Wolbach,[2,3,4,5] working with rats and guinea-pigs, showed that a vitamin A deficiency results in the metaplasia of normal oral epithelium to a keratinizing desquamating epithelium. In general, other cell growth is retarded to varying degrees. In the tooth, the formation of enamel ceases, and the odontoblasts, secondarily influenced, revert to the bone-forming state, with erratic calcific formations in the pulp. Striking deformities of the tooth take place because of the diminished formation of sound dentin or the

formation of defective dentin. These observers went so far as to express the opinion that vitamin A deficiency, during the formation of human teeth, outranks all other vitamin deficiencies in importance, although all of their work has been done with experimental animals.

Eddy and Dalldorf[6] describe the defect of the lack of Vitamin A as an atrophy and metaplasia of the enamel organ in consequence of which there is a deficient formation of enamel, a tendency toward the exposure of the dentin and interference with good formation of the teeth.

McCollum, et al,[7] consider that the ameloblasts, or enamel-forming cells, being of ectodermic origin, although specialized for calcification, are extremely sensitive to a deficiency of vitamin A like epithelium in general. McCollum contends that the ameloblasts become abnormal in appearance and instead of the formation of an even plane or curved surface they tend to buckle so that when the enamel is completed the surface presents an uneven contour. His group contends further that these cells, when inadequately nourished with vitamin A, do not lay down enamel of normal density, but rather an incompletely calcified enamel with interstices.

The most extensive observations on the effect of vitamin A deficiency in children have been reported by Bloch[8] in Denmark. He studied the permanent teeth of forty-five children who had xerophthalmia in early infancy and childhood uncomplicated by clinical symptoms of rickets. He concludes that a deficiency of vitamin A has no specific injurious effect on the formation and calcification of the teeth. On the whole, there were none of the changes that have been demonstrated in rats and attributed to a deficiency in vitamin A. A further conclusion of his was that, in the light of his experiments, a disposition to dental caries cannot be due to a deficiency in vitamin A in infancy. His conclusions are based on clinical evidence and not histological examinations. From the standpoint of the determination of the incidence of dental caries a study of this kind is of practical value, but here histologic study of the actual changes in the human enamel due to a diet deficient in vitamin A is obviously impractical if not impossible.

From a search of the literature it was found that Boyle[9] appears to have reported the first histological study of human teeth in relation to vitamin A deficiency. He encountered a case among the routine postmortem examinations at the Children's Hospital in Boston. The case which he reports is that of an infant, 3½ months old, born one month prematurely, who died as a result of congenital syphilis. Post-mortem examination revealed that the epithelium of the enamel organ was replaced by non-keratinizing, stratefied epithelium. A corresponding metaplasia of the epithelium in the trachea and pelvis of the kidney identified this infant in a group suffering from vitamin A deficiency diseases. Boyle states, "Loss of stellate reticulum, atrophy of the enamel-forming cells with little evidence of inflammation

and none of necrosis, and replacement of the highly specialized epithelium by an undifferentiated squamous type of epithelium, are collectively definite phenomena of vitamin A deficiency." Summarizing the histological finding in the tooth germ of this infant a number of changes were noted: (1) atrophy of the enamel organ, with cessation of enamel formation; (2) the replacement of the highly specialized enamel-forming cells and the stellate reticulum, by a non-keratinizing layer of squamous epithelium, defectively formed dontin, and, the abnormally wide pre-dentin which showed capillary and cell inclusions. Boyle concluded from this study that vitamin A deficiency could cause tooth hypoplasia in the human being.

May Mellanby[10] has been unable to show that vitamin A is definitely related to preservation of the teeth themselves, despite the excellent work she has done in the production of hypoplasia in teeth. Some of the confusion in this field of investigation may be attributed to the fact that vitamins A and D, both fat-soluble, occur together so commonly, and that some investigators have failed to take this factor into considerations. Day and Sedwick[11] gave daily doses of vitamins A and D for fourteen months to 147 Rochester school children of uniform age, while 171 others in the same age range served as negative controls. All lived in private homes. The observed increases in caries index was approximately the same in the two groups. Vitamin A does have an effect on the developing teeth, but apparently it has little to do with the maintenance of the integrity of those teeth after they are fully formed.

The role of vitamin C in tooth formation is apparently an important one. This vitamin has been found essential to the normal structure of the teeth of guinea-pigs.[12] Fish and Harris found that the effect of scurvy on the teeth and bone of the guinea-pig is primarily a premature degeneration of the odontoblasts, ameloblasts, cementoblasts. bone corpuscles, osteoblasts and osteoclasts. They pointed out significantly that no apparent morphological change takes place in the hard tissues already formed. Since the tooth of the guinea-pig is constantly growing out and wearing off it can hardly be considered comparable to a human tooth.

Wohlbach, and his colleagues,[5,13] demonstrated that deficiency of vitamin C results in the failure of connective tissue cells to form collagen fibers and of osteoblasts and odontoblasts to form the collagenous matrices of bone and dentin. The effects of a deficiency of this vitamin is on cells of mesenchymal origin in contrast to the ectodermal and endodermal effects of a vitamin A deficiency. Their conclusions were made following histologic studies of human infantile scurvy and through studies of the histologic sequences of progressive scurvy in growing guinea-pigs, and of the repair that followed the administration of vitamin C in natural forms. In the growing teeth (incisors) of the guinea pigs, formation of the dentin ceased

and the pulp became separated from the dentin by liquid. The odontoblasts either ceased to form dentin or formed dentin of inferior quality. The bone-forming cells, or osteoblasts, reacted in the same way. These changes occurred in from five to seven days following deprivation of vitamin C. Reinstatement of it in the diet resulted in dentin formation in 24 hours. In absolute scorbutus, the pulp was shrunken and completely freed from the dentin and apparently floating in a liquid material. Examination at 24 and 48 hour intervals after the addition of orange juice to the diet showed that the filling of the space by dentin proceeded from the surface of the odontoblasts outward.

Day,[14] in extensive experimentation with guinea-pig mothers on scorbutic diets, supplemented with various amounts of an antiscorbutic substance, demonstrated the need for a plentiful supply of vitamin C. It was found that these mothers died earlier, but the microscopic tooth picture, with either complete or partial deficiency, showed a greater degree of scurvy in the mothers than in the nursing young. During lactation, the pulp and dentin structures of the offspring were changed at will by simply varying the amount of the antiscorbutic substance in the mother's diet. Despite an absence in many cases of clinical manifestations of vitamin deficiency, and often with negative autopsy findings, even partial deficiency of vitamin C in the diet of nursing mothers became evident histologically in the teeth of the offspring through the abnormalities in enamel, dentin and pulp. Growth curves, radiograms, incisor growth, and the ash content of the skeletal structures furnished additional evidence of the importance, both to mother and offspring, of vitamin C in the guinea-pig mother's diet.

In another report, Wolbach[13] says, "Calcium metabolism is not primarily affected. In advanced scurvy calcium salts are liberated through the resorption of bone matrix which is the process of the osteoporosis of scurvy." Enamel forming cells seem not to be affected. Just how all of this animal information applies to the human is extremely controversial due, undoubtedly, to a lack of direct demonstration that has been mentioned previously. It is presumed, not proven, that teeth in the process of formation in infants may be similarly affected. However, Hess and Abramson[15] report that they were unable to find clinical data to show any effect of infantile scurvy on the permanent teeth and they say that infantile scurvy does not even delay the eruption of the teeth.

Boyle,[16] made an histopathological study of permanent and deciduous tooth germs in two cases of acute scurvy in infants, 8 and 11 months old, respectively, in whom the ribs, femur, and mandible showed striking changes from normal which were similar in all respects to those found in the growing bones of guinea-pigs on diets free from vitamin C. He found that the tooth-germs were normal in development, the enamel and dentin-forming organs were of average size and the ameloblasts and odontoblasts were

well arranged columnar cells. Minute hemorrhages, and small cysts containing clear fluid, were noted in the enamel organ of several tooth germs of the younger infant, occasional minute hemorrhages dirupted the odontoblasts, and there were areas of edema in the pulps. The tooth germs of the older child showed no variation whatsoever from the normal. This striking difference from the findings of other investigators, especially Day,[13] in regard to guinea-pigs may be attributed according to Boyle, to two factors: guinea-pig incisors grow at the rate of several mm. per week (human teeth during most rapid formation, only a few mm. per year), and guinea-pig incisors are subjected to severe functional stresses, from which unerupted teeth are protected.

Westin,[17] reporting the scorbutic changes in human teeth, describes the histo-pathological changes in the teeth as primary signs of scurvy. According to him, the changes are a metaplasia of the pulp, in which there is a spontaneous conversion of the pulp into fully developed connective tissue, with a mass of fibroblasts and collagenous fibrils, and a simultaneous loss of odontoblasts and a formation of denticles in the pulp. These denticles are described as variously shaped, round or oblong, hard substance formations, free or attached to the walls, differing in structure from dentin, pulp stone and cementum of different varieties. Hemorrhage and necroses of the pulp were common and pulp atrophy very distinctly predominated in all of the sections. The odontoblasts were destroyed, although in most cases those which provide the dentin which is surrounded by enamel showed considerably greater vitality. The changes in the pulp were most profound in the root canal and weaker in the pulp cavity.

The relation of vitamin D to the developing and fully erupted dentition has been extensively studied both here and abroad. This vitamin has been repeatedly demonstrated to be essential to the development of normal bone. This dependence has led naturally to the problem, to what extent are the teeth also affected by this factor.

It has long been accepted that rickets, in which a deficiency of vitamin D is an important causative factor, causes a delay in the progress of dentition. The teeth are usually late in eruption, with that portion of the tooth affected which was laid down at the time of the onset of the disease. Hess[18] states, "... It has long since been observed that rickets occasions a delay in dentition, the eruption of the first tooth being postponed sometimes until toward the end of the first year. ..."

It has long been thought also that rickets and the acute exanthema in infancy may cause severe hypoplasia of the enamel. The most extensive experimental investigation of this subject is that which May Mellanby[10] carried out on the puppies which her husband used in his well-known nutritional studies of rickets. The diet of these dogs consisted mainly of bread

and separated milk, and it was so devised as to be deficient on the fat-soluble vitamins. She showed that both hypoplasia of the enamel and dentin could be produced by depriving the animals of vitamin D and inducing experimental rickets at the time when the enamel was being laid down. A diet adequate in those articles in which the fat-soluble vitamins are known to be contained allowed the development of sound teeth in the puppies. A deficiency of these same substances in the diet resulted in a delayed loss of deciduous teeth, delayed eruption of the permanent dentition, irregularity in position and overlapping, especially of the incisor teeth, partial absence of, or very defective enamel, and low calcium content.

The more important question is that of the role of rickets in the development of dental caries. Probably two of the most noteworthy investigations in this field are those of Elliot and her associates,[19] and of Alfred Hess and his colleagues.[15] Whether hypoplastic teeth are more susceptible to the carious process has long been debated. Mrs. Mellanby[20] has expressed a positive opinion on this point, although she overlooks conflicting evidence and apparently completely ignores the important role of sugar in dental caries. Against her view Hess and his group came to the conclusion that there is no constant parallelism between rickets in infancy and subsequent susceptibility to caries. Elliot and her associates of the Department of Pediatrics at Yale report: first, rickets and hypoplasia of the teeth are definitely related; second, in the cases of children who had suffered from severe rickets there is a greater incidence of caries; and third, with respect to the permanent teeth in a group of seven-year-old children, no significant difference in the incidence of caries in the hypoplastic and non-hypoplastic groups was observed, the figures being 16 and 14 per cent, respectively.

Shelling and Anderson,[21] in a report on the relation of rickets and vitamin D to the incidence of dental caries, enamel hoypoplasia and malocclusion, conclude that their findings do not prove that a relationship exists between rickets and dental caries or that vitamin D is protective against caries in the primary teeth. They also found that enamel hypoplasia occurred more often in children with a history of preexistent rickets, but there was no definite relationship between hypoplasia and dental caries.

Fish[22] recently reported his inability to alter the total calcium content of the dentin of the teeth of dogs by extra vitamin D and calcium given for long periods of time, although the blood calcium of these dogs was markedly increased, and the bones themselves showed an increase in their opacity to x-rays. Histologically, also, there appeared to be new deposits of highly calcified bone matrix, but there were no apparent changes in the other tissues that were examined.

Lilly[23] reports his failure to produce caries in white rats by rachitogenic diets, fed for long periods (8 months to 1 year), although caries can be produced at will merely by varying the fineness or coarseness of the diet!

Becks and Ryder[24] examined the teeth of rats, fed on a diet low in phos-

phorus and vitamin D, and found a degeneration of the odontoblasts was present. Even though a generous amount of calcium was present in the diet, normal dentin could not be formed owing to a deficiency of phosphorus and vitamin D.

Regarding the possibilities of an adequate diet as an insurance against the occurrence of dental caries in fully erupted teeth, one has but to turn to the work of Logan and Kronfeld.[25] They have shown conclusively that the permanent teeth in their entirety are calcified postnatally, contrary to the old notion that the first molars calcified prenatally. Therefore, prenatal management is chiefly effective in the protection of the maternal source of tooth-building materials and not in the determination of the qualities of tooth structure as previously thought. Kronfeld, in another article,[26] states, "Disturbances of calcification of the deciduous teeth are almost entirely confined to the postnatally formed portion of these teeth. During pregnancy, when the fetus develops at the expense of the maternal organism, the mother is able to permit normal calcification of the teeth. After birth, however, the infant is often subjected to various illnesses and metabolic disturbances which may adversely influence the postnatally formed (outer) portion of the enamel and result in hypoplasia of the deciduous teeth. Our present knowledge of the prenatally and postnatally formed portions of the deciduous teeth has led to the tentative conclusion that the condition of the mother during pregnancy has but little influence so far as the child's teeth are concerned."

In the light of all of this evidence, one may say that from birth until the crowns of the third molars are fully formed, the diet should be as nearly adequate nutritionally as the economic circumstances of the individual permit. Regarding the effects of food factors (minerals and vitamins) on fully formed enamel, no conclusive evidence of a form of circulation in the enamel has ever been brought forward. As soon as the enamel is fully formed and the tooth erupts the ameloblasts become a keratinized cuticle, and there remains in the enamel no power that possesses the ability to calcify hard tissues. Fish, as previously stated, was unable to alter the calcium content of the dentin. No amount of feeding will cause secondary dentin formation or sclerosis, rather, a local stimulus in the form of an irritation to the tooth itself must be present. An analysis of the publications of research workers regarding the prevention of dental caries through vitamin feeding reveals that they fail to take into consideration the role of sugar in the process, a role that has a pertinent significance. In conclusion, it cannot be stressed too often that all persons who investigate diet in its relation to dental problems should exercise extreme care before they draw far-reaching conclusions. Experiments of this nature should have rigid controls just as animal experiments do.

BIBLIOGRAPHY

1. Hoppert, C. A., Webber, P. A., and Caniff, T. L. The production of dental caries in rats fed on an adequate diet. J. Dent. Res., 12:161-71, Feb. 1932.

2. Wolbach, S. B., and Howe, P. R. Tissue changes following deprivation of fat-soluble A vitamin. J. Exper. Med., 42:753-65, Dec. 1925.
3. Wolbach, S. B., and Howe, P. R. Vitamin A deficiency in the guinea-pig. Arch. Path. and Lab. Med., 5:239-53, Feb. 1928.
4. Bessey, O. A., and Wolbach, S. B. Vitamin A. physiology and pathology. Am. Med. A. J., 110:2072-80, June 18, 1938.
5. Wolbach, S. B. The pathologic changes resulting from vitamin deficiency. Am. Med. A. J., 108:7-13, Jan. 2, 1937.
6. Eddy, W. H., and Dalldorf, Gilbert. The avitaminoses . . . 2nd ed. (p. 108, 109, 320-22, 380-90) Baltimore, Williams and Wilkins, 1941. 519 p.
7. McCollum, E. V., et al. The newer knowledge of nutrition. 5th ed., New York, Macmillan, 1939. 701 p. (p. 603-6)
8. Black, C. E. Effects of deficiency in vitamins in infancy. Am. J. Dis. Child., 42:263-78, Aug. 1931.
9. Boyle, P. E. Manifestations of vitamin A deficiency in a human tooth-germ. J. Dent. Res., 13:39-50, Feb. 1933.
10. Mellanby, May. Diet and the teeth: an experimental study . . . Part II. London, His Majesty's Stationery Office, 1930. VIII + 93 p. (Medical research council [Gt. Brit.] Special report series No. 153.)
11. Day, C. D. M., and Sedwick, H. J. Fat-soluble vitamins and dental caries in children. J. Nutrit., 8:309-28, Sept. 1934.
12. Fish, E. W., and Harris, L. J. The effect of vitamin C deficiency on tooth-structure in guinea pigs. Brit. Dent. J., 58:3-20, Jan. 1, 1935.
13. Boyle, P. E., Bessey, O. A., and Wolbach, S. B. Experimental production of diffuse alveolar bone atrophy type of periodontal disease by diets deficient in ascorbic acid (vitamin C). Am. Dent. A. J., 24:1768-77, Nov. 1937.
14. Day, C. D. M. Dental dystrophies resulting from dietary deficiencies during lactation. J. Dent. Res., 14:212-3, June 1934.
15. Hess, A. F., and Abramson, Harold. The etiology of dental caries. Dent. Cosmos, 73:849-66, Sept. 1931.
16. Boyle, P. E. The tooth germ in acute scurvy. abst. J. Dent. Res., 14:172, July 1934.
17. Westin, Goesta. Scorbutic changes in the teeth and jaws in man. Dent. Cosmos, 67:868-72, Sept. 1925.
18. Hess, A. F. Rickets, osteomalacia and tetany. Philadelphia, Lea and Febinger, 1929. XV + 485 p. (p. 230)
19. Eliot, M. M., Souther, S. P., Anderson, B. G., and Arnim, S. S. A study of the teeth of a group of school children previously examined for rickets. Am. J. Dis. Child., 48:713-29, Oct. 1934.
20. Mellanby, May. The role of nutrition as a factor in resistance of dental caries. Brit. Dent. J., 62:241-59, Mar. 1, 1937.
21. Shelling, D.H., and Anderson, G. M. Relation of rickets and vitamin D to the incidence of dental caries, enamel hypoplasia and malocclusion in children. Am. Dent. A. J., 23:840-6, May 1936.
22. Fish, E. W. The effect of vitamin D on the calicum content of the dentin. J. Physiol., 84:272-8, June 18, 1935.
23. Lilly, C. A. Failure to produce experimental dental caries in the white rat with high carbohydrate diet and bacillus acidophilus or vitamin D deficiency. J. Nutrit., 5:175-81, Jan. 1932.
24. Becks, Herman, and Ryder, W. D. Experimental rickets and calcification of dentin. Arch. Path., 12:358-86, Sept. 1931.
25. Logan, W. H. G., and Kronfeld, Rudolf. Development of human jaws and surrounding structures from birth to age of fifteen years. Am. Dent. A. J., 20: 379-427, Mar. 1933.
26. Kronfeld, Rudolf. Calcium metabolism and teeth. Ill. Dent. J., 9:95-7, Mar. 1940.

—1607 E. Stadium Blvd.

A. S. D. C. News and Views

SECRETARY'S MESSAGE

Your Secretary has been trying to encourage the payment of dues which at this time are declared delinquent for the current year, according to the Constitution and By-Laws. Remittances to date compare commendably with remittances received last year to date. This is most encouraging in view of the unfavorable influences of war. The THIRD and FINAL NOTICE of dues payable has been mailed from this office, and should be received early in May. Following this, those who have not paid their dues by June 30th will have to be dropped as delinquent. The prompt co-operation of the Unit secretaries, and immediate remittances by respective members will assure their uninterrupted reception of this Journal and continuance of membership. After the dropping date re-instatement can be effected by forwarding your dues direct to me as secretary.

Under the stress and circumstances of the war membership in this Society, and the Society itself, has additional responsibilities. Due to increased buying power, people who were unable earlier to do so are seeking dental services for their children. Many younger practitioners to whom dentistry for children was attractive are now in the armed forces. Further, and this is true especially in defense work areas, there has been a tremendous increase in population with a concurrent increase in demand upon the already depleted professional time available.

Finally, and regrettably, the general practitioner in many instances is now excluding children from his practice under the pretext of "being too busy." The truth of the matter is that he is more interested and attracted to restorative work such as bridges and dentures for adults, rather than to preventive dentistry as exemplified in dentistry for children.

Unfortunately these circumstances in spite of the efforts of others who are professionally sincere, will result in an increase in irreparable dental damage in the mouths of the nation's youth. These threats present a challenge to this Society and to its members to do even more than they have in the past for our American children.

R. M. Erwin, Jr.
613 Corbett Bldg., Portland, Oregon

THE MASSACHUSETTS UNIT

The Massachusetts unit of the American Society of Dentistry for Children was formed on April 17, 1941. The purpose and scope of this organization is to stimulate greater interest and development in dentistry for children in the United States. Also, to create an enthusiasm which by its example will serve to awaken a spirit of emulation and cooperation to the same end in other countries throughout the world.

In 1942 the Massachusetts unit voted to have monthly meetings replace one annual meeting in order to allow for more frequent discussions of current problems from time to time. The organization agreed to have these meetings take place in the form of a luncheon meeting each month. The response to these meetings has been gratifying with respect to both numbers and enthusiasm.

Group participation was accomplished by beginning each meeting with a question and answer period. These quizzes stimulated many interesting ideas and subjects for discussion.

In the past year the organization helped the Massachusetts Department of Public Health sponsor a refresher course in Dentistry for Children.

Standards for Judging Dental Clinics have been set up and approved by the unit. These will assist the Massachusetts Department of Public Health dentists in their new responsibility of licensing dental clinics in Massachusetts in the coming year.

Respectfully submitted,
CATHERINE F. RONAN, D.M.D.
BAILEY P. CHADBOURNE, D.M.D.
HAROLD BERK, D.M.D.

June 28, 1943

RESOLUTION

Adopted at the 87th Annual Meeting of the Michigan State Dental Society held in Detroit, April 20, 1943

Whereas, Senator James Couzens through his great interest in child welfare created the Children's Fund of Michigan; and

Whereas, the purpose of the Children's Fund of Michigan is "to promote the health, welfare, happiness and development of the children of Michigan primarily, and elsewhere in the world"; and

Whereas, the officers and trustees of the Fund have created extensive dental programs principally throughout the rural districts of seventy counties of our state, and in metropolitan cities, thus contributing to a higher standard of dental health to many thousands of children, who otherwise through environment and economic conditions, were denied this privilege; and

Whereas, this and other dental projects, such as dental research and dental educational programs, have proven of great value by producing higher standards of dentistry, available to the citizens of our commonwealth; therefore

Be It Resolved, that the Michigan State Dental Society, assembled in annual meeting, by the adoption of this resolution, does hereby express to the officers and trustees of the Children's Fund of Michigan its appreciation and commendation of their contributions to the children of our state and the profession of dentistry; and

Be It Further Resolved, that this resolution be spread upon the minutes of this annual meeting; that it be published in the Journal of the Michigan State Dental Society, and that copies be sent to the officers and trustees of the Children's Fund of Michigan.